Tips on Buying a New FPD

WARNING!!!

READING OR LISTENING TO THE FOLLOWING MATERIAL MAY CAUSE PERMANENT DAMAGE TO YOUR PRESENT ABILITY TO ENJOY PRACTICALLY ANY IMAGE ON ANY DISPLAY SCREEN. LEARNING THE FOLLOWING GUIDELINES WILL CAUSE YOU TO SEE SOME OF THE SUBTLE DIFFERENCES IN DISPLAYS SO THEY NO LONGER LOOK ALL ALIKE.

BE CAREFUL! PROCEED AT YOUR OWN RISK!

IF YOU ALREADY HAVE PURCHASED A NEW DISPLAY, ABSORBING THIS MATERIAL MAY NOT BE THE WISEST THING TO DO. YOU HAVE A FEW SECONDS TO LEAVE THE ROOM.

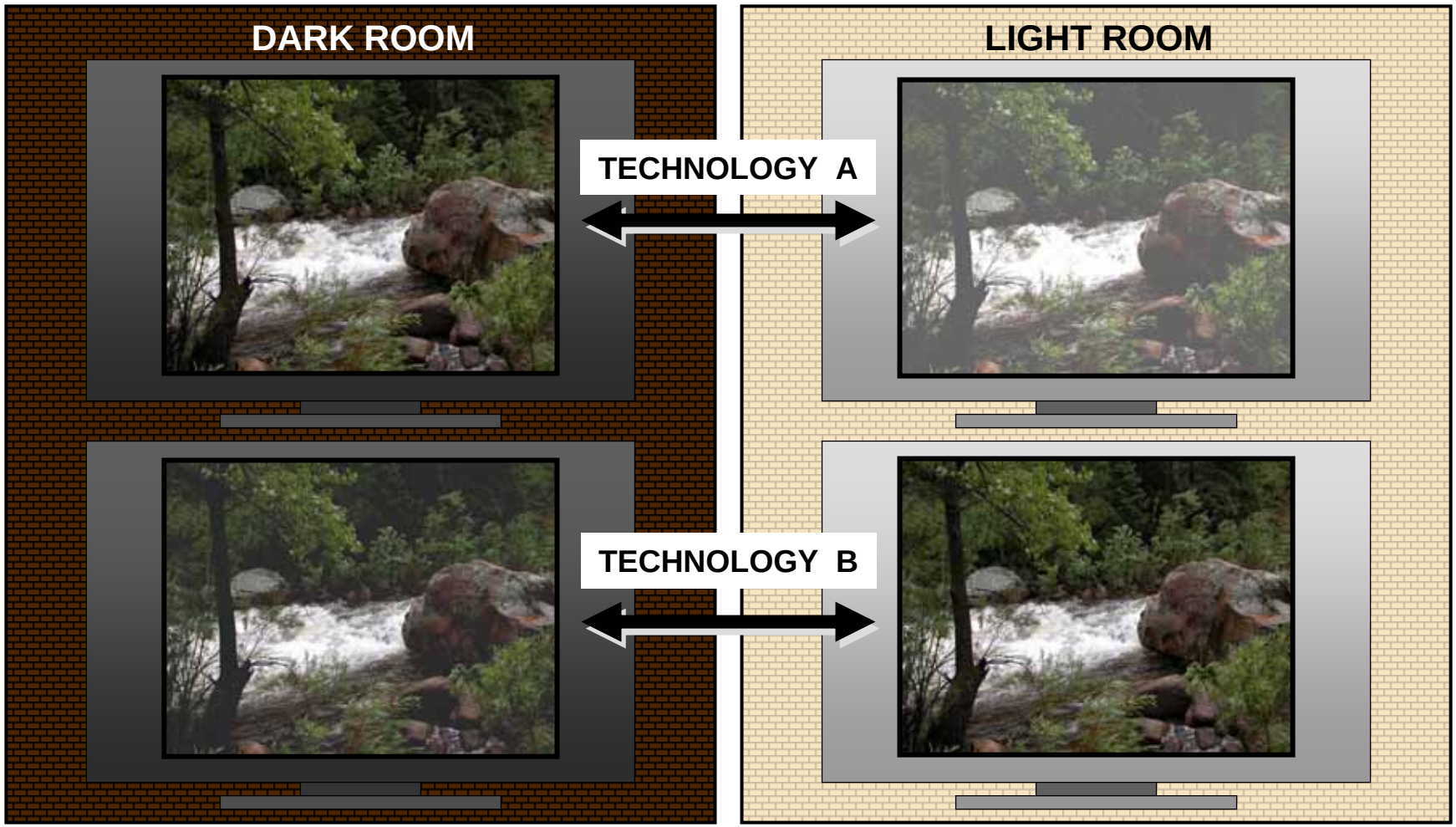
YOU'VE BEEN WARNED!

These slides are concluding comments from a seminar and course on display metrology—see www.fpd.nist.gov for more details.

Tips on Buying a New FPD, Cont.

PROPER AMBIENT

Some displays will perform best in a very dark surround. Some will perform best in a bright surround. Attempt to evaluate the display in the environment into which you intend to place it.

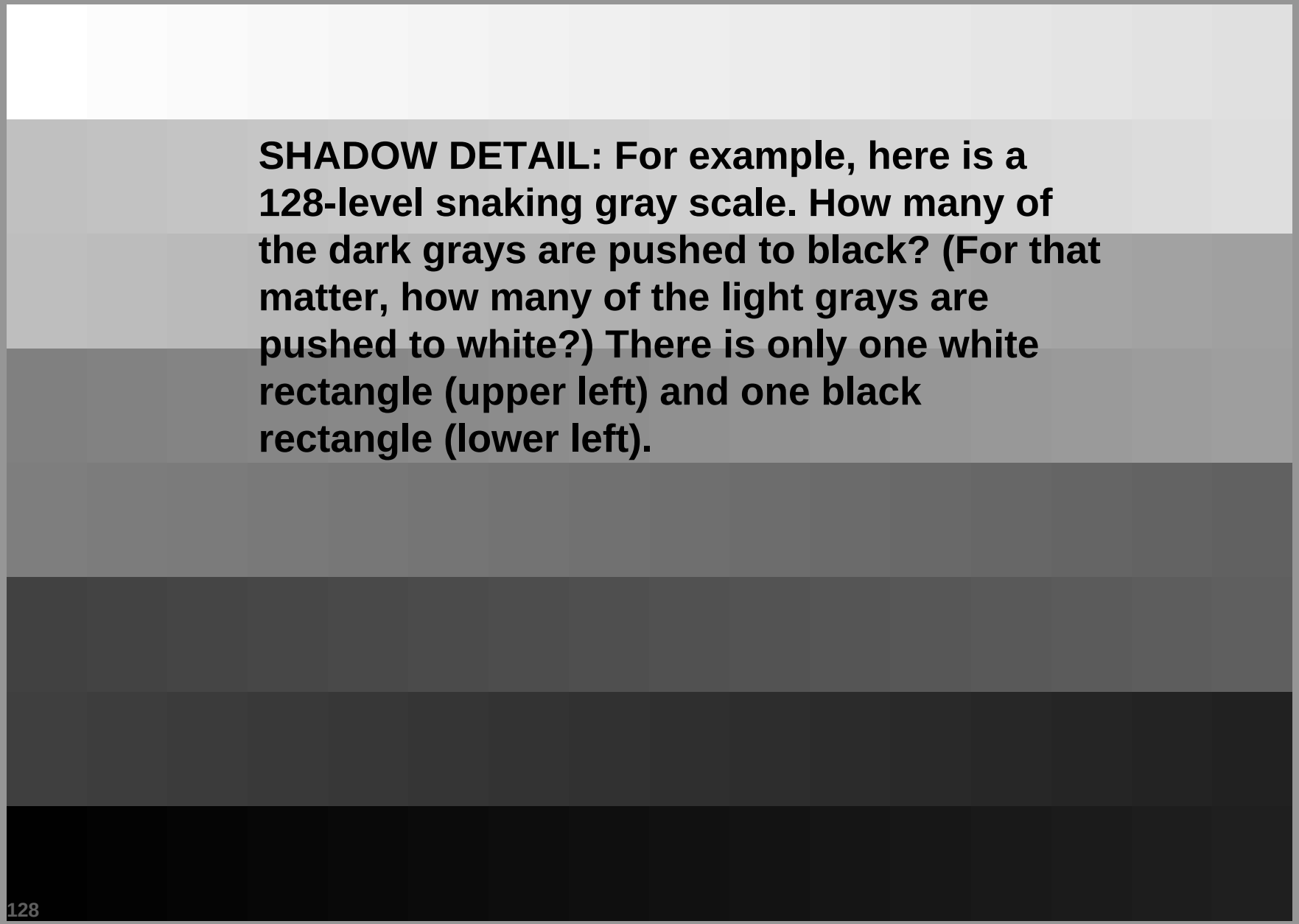


LOOK AT THE BLACKS !!!!!

Most displays exhibit sufficient brightness or you wouldn't consider them in the first place. Often the real test of the display is how it shows its blacks when it is placed in an environment similar to your home. Consider both large-area blacks and small-area blacks. Some displays will show wonderful blacks in a bright environment, but those same blacks will be seen as dark gray when that display is placed in a dark room. Some displays will show wonderful blacks in a dark room, but they will be washed out by reflections in a bright room. Also look for shadow detail in the dark regions.

Darkness of small-area blacks are very important.

Tips on Buying a New FPD, Cont.



Each rectangle represents a step of two gray levels: 0 (black), 2, 4, 6, 8, … 248, 250, 252, 255 (white, last step is three gray levels). — Pattern name SSW128.

REFLECTION PROPERTIES

Some displays will reflect light so that you can see the distinct reflected image of the source because they have a strong specular component. Other displays will diffuse the light so that you just see a fuzzy ball of light instead of a distinct image of the source—a strong haze component. How large that fuzzy ball is will depend upon the microstructure of the surface treatment. This diffusing treatment is often called anti-glare or non-glare. Some displays will have both properties as well as a third Lambertian component (like dark gray matte paint). You will want to keep in mind your living-room lighting and window configuration when you examine candidate displays. Some displays will allow the mirror-like reflections but will reduce them considerably by using an anti-reflection coating. You can often recognize such coatings by the dim magenta, dim blue, or dim green reflections of lights.

PLACEMENT

Some of the problems with reflections can be reduced by placing the display so that you avoid seeing bright objects such as windows or lamps in its reflection.

Light Living Room Effects on Image

Darkroom Image

Specular & Lambertian with AR

Haze only, with AR

Specular & Lambertian no AR

Haze only, no AR

SPECIFICATIONS

Unfortunately, specifications claimed for displays cannot always be used to compare them. They may not employ measurement standards like the FPDM but use their own methods. Use and trust your eyes. What you see can be exactly what you get. Some displays will exhibit the same luminance when they show a small white area or fill the screen with white. Other displays will show a bright white small area but become much dimmer when displaying full-screen white. So when you evaluate the display, be sure to view a wide variety of scenes.

Contrast: 500:1
Luminance: 300 cd/m^2

Contrast: 500:1
Luminance: 300 cd/m^2

VIEWING ANGLE

The problems with viewing angle are gradually being eliminated. However, if you will have kids on the floor looking at the display while you sit on the sofa or if you have a room filled with people viewing the display from all different angles, then the display's viewing angle properties may be important to you. So, check it out. Move around and see what it does with the colors and especially the blacks. Some displays suffer most viewing-angle problems when viewed from the lower right or left. Often static images are useful in such evaluations. Look for contrast reductions as well as color shifts.

STATIC IMAGES

Should you be able to view static images on the screen (if the display can be hooked up to a computer), then there are a large variety of images you can use, dark scenes, light scenes, but especially faces. Moving scenes may indicate motion artifacts, but generally don't give you enough time to consider the reflection properties, viewing angle properties, the whites (both small and large area), and the blacks (both small and large area).

http://www.fpdl.nist.gov → Click on Patterns

Available Patterns from NIST:

- ***Setup & Testing***
- ***Faces***
- ***Natural Scenes***

FTP whatever you want.

All in the public domain!